



# Correspondence

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Date: June 27, 2012

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RE: Potential Porewater Sampling Locations  
Cornell-Dubilier Electronics Superfund Site – OU4 Bound Brook  
W912DQ-11-D-3009, Task Order 0013

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On behalf of the United States Environmental Protection Agency (USEPA) and the United States Army Corps of Engineers (USACE), The Louis Berger Group, Inc. (Berger) is conducting a Remedial Investigation and Feasibility Study (RI/FS) for Bound Brook in Middlesex County (New Jersey), which is defined as Operable Unit 4 of the Cornell-Dubilier Electronics Superfund Site. According to the Quality Assurance Project Plan (QAPP) – Field Modification No. 6, passive samplers will be deployed in Bound Brook to measure dissolved-phase polychlorinated biphenyl (PCB) congeners and volatile organic compounds (VOC) in porewater and surface water. QAPP Worksheet 18 states that final sampling locations would be proposed following a water quality/stream flow survey and additional reconnaissance of sediment bed thickness.

Potential sampling locations were selected based on evaluation of the May 2012 water quality/stream flow survey (see accompanying text below) and reconnaissance of sediment bed thickness conducted in June 2012. Berger will begin deployment of sampling equipment following USACE approval of Field Modification No. 6 and the potential sampling locations. A summary of potential sampling locations is listed below (refer to attached table and maps in Figures 1-3).

- Three upstream sampling locations were selected between Talmadge Bridge at river mile (RM) 8.3 and the upstream side of the twin culverts, where Bound Brook passes beneath a former railroad spur, at RM6.55. A set of passive samplers (one for VOC and one for PCB) will be deployed at each sampling location, yielding 3 sets of passive samplers in this upstream area (refer to green shaded rows in Table 1).

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- Ten sampling locations were selected within Reaches 1-4 of the OU3 groundwater flux model<sup>1</sup> between the downstream side of the twin culverts at RM6.55 and the Lakeview Avenue Bridge at RM6.15. One or two sets of passive samplers will be deployed at each sampling locations, yielding 15 sets of passive samplers in the modeled area (refer to the orange shaded rows in Table 1). Note that when two sets of passive sampler are deployed at a potential sampling location, they will represent distinct samples (not co-locates).
  - Two downstream sampling locations were selected between Lakeview Avenue Bridge at RM6.15 and downstream of the OU3 groundwater flux model at RM5.8. A set of passive samplers will be deployed at each sampling location, yielding two sets of passive samplers in the downstream area (refer to blue shaded rows in Table 1).

#### **Evaluation of May 2012 Water Quality/Stream Flow Survey**

On May 7-9, 2012, Berger collected surface water physicochemical parameters using a Horiba U52, including temperature, conductivity, pH, salinity, and oxidation-reduction potential (ORP) from transects across Bound Brook every 100 feet between RM5.7 (near the confluence of Bound Brook and Cedar Brook) and RM6.9 (upstream of Belmont Avenue Bridge).<sup>2,3,4</sup> At each transect, surface water parameters were measured from the bottom and top of the water column on 5-foot intervals across the brook. Plots of each transect for each parameter are provided in the attached spreadsheets. The purpose of this field effort was to identify locations where groundwater is potentially discharging to Bound Brook, especially adjacent to and downstream of the former Cornell-Dubilier Electronics (CDE) facility, to select placement of porewater passive samplers.

The former CDE facility is located adjacent to the brook starting at about RM6.55, or Stream Flow Transect No. 18 (SF18), where Bound Brook passes through a culvert beneath a former railroad spur. Based on the model, some groundwater from the former CDE facility may discharge upstream of the culvert, but further upstream (above SF12) is likely outside the modeled area of groundwater discharge from the former CDE facility. The data suggest that conductivity and salinity are fairly stable between SF1 and SF12; however, temperature, pH and ORP do vary between transects. Temperature increases significantly between SF5 and SF7 and then gradually increases in the downstream direction; however, a tributary enters the stream in this same reach. Values for pH increase in the downstream direction as well but these changes are not as dramatic between SF5 and SF7 as temperature. ORP begins above 100 mV with some variation from bank to bank but drops below 90 mV and becomes highly variable from

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<sup>1</sup> The upstream boundary of the OU3 groundwater model is located at RM6.6, and the downstream boundary is located at RM5.95.

<sup>2</sup> Stream flow transects SF1 to SF12 were measured on May 7; SF18 to SF37 were measured on May 8; and the remainder were measured on May 9, 2012. Some of the observed variation in parameters can be explained by day to day differences.

<sup>3</sup> Due to field conditions (*i.e.*, presence of debris or water depth), some proposed transects were skipped. In addition, between Transect 42 and 59, water quality measurements were collected at every other transect due to approaching storm conditions.

<sup>4</sup> During the May 2012 survey, stream flow measurements were also collected. This survey suggests a slow increase in flow in the downstream direction; however, no significant increase over short stretches of the stream was observed. The slow increase downstream is consistent with diffuse groundwater discharge rather than large point discharges, such as discrete springs.

bank to bank by SF3. It is possible that groundwater inputs to the stream are responsible for some of the variation seen in these parameters above the former CDE facility.

Notable variations in water quality parameters moving downstream from SF18 (adjacent to the former CDE facility) are listed below (references to left bank and right bank are viewed when facing upstream). From these observations, the highest variability in surface water quality parameters was observed between SF30 and SF34, suggesting a potential groundwater discharge area. This area corresponds well to the groundwater flow model simulations of likely discharge of contaminated groundwater.

- At SF18, increased salinity and conductivity were detected on the right bank compared to the rest of the transect and the next downstream transect (SF19). Temperature and pH showed some variability.
- At SF20, salinity showed stratification in the right central portion of the channel. Temperature and salinity increased on the right bank.
- At SF26, temperature slowly increased from SF20. Salinity, conductivity, and pH are anomalous on left bank.
- At SF29, temperature continued to increase, and ORP begins to increase. Conductivity and salinity increased on the left side of the stream. (Note that SF29 is immediately below a small tributary from the left.)
- At SF30, temperature and ORP continued to increase; pH begins to increase; and conductivity and salinity are still higher on the left side of the brook.
- At SF31 and SF32, ORP and temperature significantly increased, pH decreased, and conductivity and salinity are variable across the transects. These two transects are different than most other transects recorded during this survey.
- At SF33, ORP and temperature decreased, pH increased slightly, and conductivity and salinity become more stable but at a higher level than at SF30. (Salinity equal to 0.4 ppt on the left bank and 0.3 ppt on the right bank.) This pattern repeats at SF34.
- At SF36 and 37, the water quality parameters are less variable and seem stable from bank to bank.
- At SF42, ORP changed significantly, with a wide negative to positive variation across the transect; this is similar at SF47, the next transect measured. Note that the field crew had to skip measurements at some transects due to an approaching storm.
- At SF49, ORP is variable across the transect, similar to SF42, but at a lower value.
- At SF55, conductivity and salinity are stratified in the left-center part of the transect.
- At SF59, ORP becomes highly variable, and salinity decreased on the right bank.

#### **Evaluation of June 2012 Reconnaissance**

On June 20-22, 2012, Berger conducted a second reconnaissance on Bound Brook, focusing on (1) sediment bed thickness at potential sampling locations and (2) investigating the stretch of brook between the Conrail Railroad tracks/walking bridge at RM6.3 (corresponding to SF29) and Lakeview Avenue Bridge (corresponding to SF37) for possible outfall locations or groundwater springs/seeps.

The passive sampling equipment requires approximately 12 inches of sediment to be securely deployed in the sediment bed. Probing was conducted at each potential sampling location to confirm sediment bed thickness. A flat shovel blade was also pushed into the sediment bed to assess whether underground debris was present (note that the PCB passive samplers will be sensitive to debris that could potentially tear the polyethylene matrix). Refer to Table 1 for final sediment penetration thicknesses recorded. During the reconnaissance, the field crew noted minimal sediment depths (2 inches) to no sediments present between SF29 and SF32, which corresponded to the area with the most significant water quality variations observed in May 2012. Weathered bedrock was exposed directly to the brook. Sample deployment logistics are currently being engineered; however, it is likely that in this stretch of brook, field crew will install galvanized hooks into the bedrock to secure polyethylene samplers against the bedrock. Samples from these locations will represent surface water samples only; surface sediment and corresponding porewater samples will not be collected due to the absence or minimal presence of unconsolidated sediments.

During the June reconnaissance, the field crew also focused on the visible presence of discharge points or groundwater seeps/springs that may have accounted for the significant water quality variations observed in May 2012. No discharge points were observed, providing another line of evidence that changes in water quality were likely associated with potential diffuse groundwater discharge from the bedrock outcropping in the bed of the brook. Based on the May 2012 water quality observations and June 2012 field reconnaissance of sediment bed thickness, Berger proposes to deploy porewater passive samplers at the locations presented in Table 1 and Figures 1-3. A total of 20 sets of passive samplers will be deployed.

Attachments:

Table 1: Potential Porewater Sampling Locations

Figures 1-3: May 2012 Stream Flow Transects and Proposed Porewater Sampling Locations

Attachment 1: (submitted electronically) MS Excel spreadsheet of water quality measurements

Table 1: Potential Porewater Sampling Locations  
Cornell-Dubilier Electronics Superfund Site  
OU4 Bound Brook

Number	Location SF= Stream Flow T=2010 Sediment Probing Transect	OU3 Model Reach	Recon Penetration Depth (inches)	Was TCE or DCE detected in surface sediment in 2011? NS = Not sampled	Rationale	Will additional geotechnical core be required?
1	Talmadge Bridge (RM8.3)	Upstream	60 inches	No	Bound Brook upstream boundary conditions at Talmadge Bridge	No
2	SF13/T353	Upstream	24 inches (A side)	No	Upstream of the OU3 groundwater model - no variation in water quality measurements observed	No
3	T350	Reach 1	18 inches (A side)	Yes	Upstream of twin culvert (100 feet upstream)	Yes
4 and 5	SF18/T348	Reach 1	18 inches (on left side of culvert)	Yes	Downstream of twin culvert, where isolated changes in water quality were observed	No
6 and 7	SF20/T346	Reach 1	12 inches (A side) 18 inches	Yes	Upstream of OU2 drainage basin, where isolated changes in water quality were observed	No
8	SF22/T344	Reach 2	12 inches (A side)	Yes	Reach 2 representation	No
9 and 10	SF26	Reach 3	Sufficient sediment present; depth of penetration not recorded	NS	Isolated changes in conductivity and salinity were observed	Yes
11	SF28/T337	Reach 3	Bedrock (surface water only)	Yes	Upstream of railroad bridge. Upstream boundary of significant water quality variations observed between SF30 and SF34	No
12	SF29	Reach 3	Bedrock (surface water only)	NS	Downstream of railroad bridge and adjacent to possible discharge point where changes in conductivity and salinity were observed	Yes
13 and 14	SF31/T333B	Reach 3	Sufficient sediment present; depth of penetration not recorded	Yes	Significant water quality variations observed (conductivity, salinity, high ORP, and high water temperature)	Yes
15	SF32/T333A	Reach 3	Bedrock (surface water only)	Yes	Significant water quality variations observed (conductivity, salinity, high ORP, and high water temperature)	Yes
16 and 17	SF34	Reach 3	14 inches (B side)	NS	Significant water quality variations observed (conductivity, salinity, high ORP, and high water temperature)	Yes
18	SF37/T328	Reach 4	18 inches (B side)	Yes	Downstream of Lakeview Avenue Bridge. Downstream boundary of significant water quality variations – water quality parameters stabilize	No
19	SF38	Reach 4	14 inches (B side)	NS	Downstream of Lakeview Avenue Bridge. Downstream boundary of significant water quality variations	Yes
20	SF57/T309	Downstream	36 inches	No	Downstream conditions	No

Notes

1: When more than one passive sampler is deployed at a proposed sampling location, they will each represent distinct samples (not co-locates).

2: At a location where more than one passive sampler is deployed, sediment probing will be conducted during the deployment of each passive sampler to qualitatively assess geological sediment texture. If probing suggests that the sediment bed is homogeneous, one geological core will be collected for the location. If probing suggests that the sediment bed is heterogeneous, then two geological cores will be collected (one at each passive sampler location).

TCE = Trichloroethene  
DCE = 1,2-cis-dichloroethene



2012May-StreamFlowSurvey



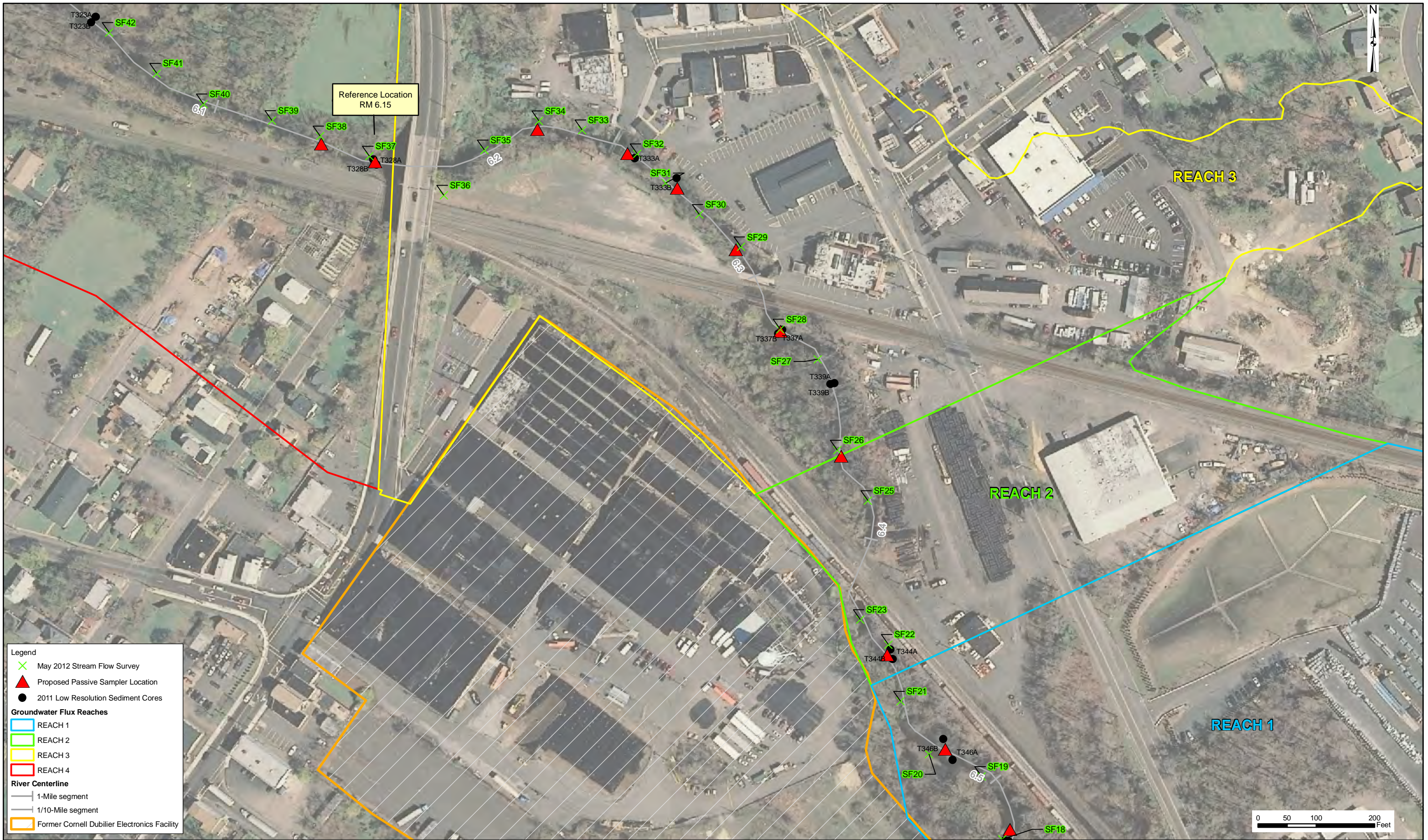
Cornell-Dubilier Electronics  
Superfund Site  
South Plainfield, New Jersey

May 2012 Stream Flow Transects and Proposed Porewater Sampling Locations  
*OU4 Remedial Investigation/Feasibility Study*

JUNE 2012  
**Figure 1**



2012 May-StreamFlowSurvey



Legend

May 2012 Stream Flow Survey

Proposed Passive Sampler Location

2011 Low Resolution Sediment Cores

Groundwater Flux Reaches

REACH 1

REACH 2

REACH 3

REACH 4

River Centerline

1-Mile segment

1/10-Mile segment

Former Cornell Dubilier Electronics Facility



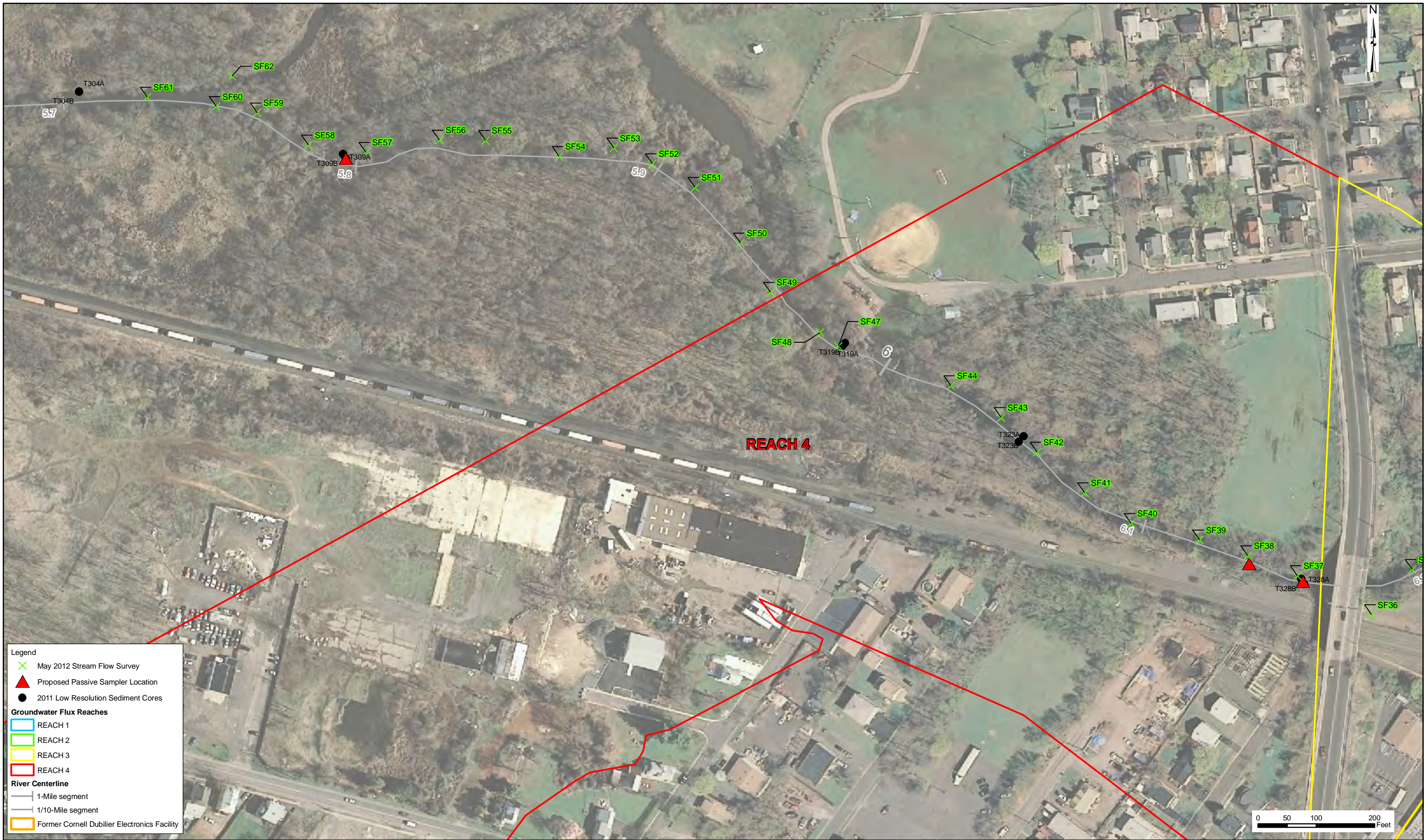
Cornell-Dubilier Electronics  
Superfund Site  
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May 2012 Stream Flow Transects and Proposed Porewater Sampling Locations  
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**Figure 2**



2012 May-StreamFlowSurvey



Cornell-Dubilier Electronics  
Superfund Site  
South Plainfield, New Jersey

May 2012 Stream Flow Transects and Proposed Porewater Sampling Locations  
*OU4 Remedial Investigation/Feasibility Study*

JUNE 2012  
**Figure 3**